Grinding it Out: Do New Adhesives Bond to Uncut Enamel? (1/03)

Microtensile bond strength of self-etching adhesives to ground and unground enamel. Ibarra G, Vargas MA, Armstrong SR, Cobb DS. J Adhes Dent 2002;4:115-124.

This study tested the bond strength of three types of bonding agents to ground and unground enamel, and examined the specimens after testing to see where they had failed. Seventy-two bovine incisors were used in the research. Half of the teeth were assigned to the Ground Enamel Group and were prepared by grinding the facial to produce a flat surface for bonding. The other 32 teeth (the Unground Enamel Group) were bonded without prior grinding. The three tested bonding agents were: a three-step product (Scotchbond Multi-Purpose, 3M ESPE) consisting of an etchant, primer, and adhesive; a two-step, self-etching primer product (Clearfil SE Bond, Kuraray/J. Morita) consisting of a self-etching primer and an adhesive; and a one-step, all-in-one, self-etching product (Prompt L-Pop, 3M ESPE) consisting of a single solution. Each bonding product was used to bond a button of composite resin to teeth in each group (unground and ground enamel), and their microtensile bond strength was measured. **The results were that no differences in bond strengths were found among the three dentin bonding products. Also, there were no differences between bond strengths to ground and to unground enamel for any of the bonding agents.**

DIS Comment: Bonding agents with self-etching primers (e.g., Clearfil SE Bond and Clearfil Liner Bond 2V, Kuraray/J. Morita; Touch & Bond, Parkell) have been shown to bond well to dentin and to cut (i.e., prepared or roughened) enamel. Their ability to bond to uncut or unprepared enamel is questionable, however. Some research found that some self-etching primers produce a more shallow and less well-defined etching pattern on unground enamel than does phosphoric acid.[1,2] This makes sense because most of the self-etching primers are not as acidic as traditional enamel etchants, which are typically 32% to 37% phosphoric acid. The manufacturers of many of the self-etching primer bonding products do, in fact, recommend that uncut enamel be separately etched with phosphoric acid before the bonding agent is applied. Although this study found no difference in bond strength to unground enamel for the self-etching primer products compared to the one that used phosphoric acid, other research has shown a difference.[3] It is always wise to follow the specific product's instructions when faced with conflicting research findings.

References

1. Hayakawa T, Kikutake K, Neomoto K. Influence of self-etching primer treatment on the adhesion of resin composites to polished dentin and enamel. Dent Mater 1998;14:99-105.
2. Perdigão J, Lopes L, Lambrechts P, Leitao J, Van Meerbeek B, Vanherle G. Effect of self-etching primer on enamel shear bond strengths and SEM morphology. Am J Dent 1997;10:141-146.
3. Kanemura N, Sano H, Tagami J. Tensile bond strength to and SEM evaluation of ground and intact enamel surfaces. J Dent 1999;27:523-530.